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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/416,270	10/12/1999	YOUN-HAN CHANG	400396/YPLEE	5941

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 03/27/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/416,270

Applicant(s)
Chang

Examiner
Tracy Dove

Art Unit
1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jan 22, 2003
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-34 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

This Office Action is in response to the communication filed on 1/22/03. Claims 23-34 are pending. Claims 23-34 are rejected under 35 U.S.C. 112, first paragraph, and claims 30-34 are further rejected in view of the prior art. Claims 1-22 have been canceled.

Continued Prosecution Application

The request filed on 1/22/03 for a Divisional Continued Prosecution Application (DCPA) under 37 CFR 1.53(d) is acceptable and a DCPA has been established. An action on the DCPA follows.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23-34 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for LiCoO_2 (page 5), does not reasonably provide enablement for any other "lithium salt" (claim 23). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

Claim 29 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a first solvent of acetone and a second solvent of N-methyl-2-pyrrolidone, does not reasonably provide enablement for a first solvent of N-methyl-2-

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pyrrolidone and a second solvent of acetone (page 5 of specification). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24-27 and 31-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 24 and 25 recite “applying the positive active material slurry to the positive collector”, however, claim 23 recites the positive active material slurry produces “a first mixture” which is applied to opposite sides of an aluminum foil. Note since the “first mixture” of claim 23 is applied to the current collector, claim 25 is inconsistent being that the claim requires the formation of sheets (not a solution/mixture).

Claims 26 and 27 recite “applying the negative active material slurry to the negative collector”, however, claim 23 recites the negative active material slurry produces “a second mixture” which is applied to opposite sides of a copper foil. Note since the “second mixture” of claim 23 is applied to the current collector, claim 27 is inconsistent being that the claim requires the formation of sheets (not a solution/mixture).

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-34 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Fauteux et al., US 4,925,752.

Fauteux teaches a solid state alkali metal anode cell having significant improvements in cell impedance and, in turn, rechargeability is provided (col. 2, lines 31-36). The cell comprises an alkali metal anode layer, a solid ionically conducting electrolyte layer and a cathode/current collector layer (see abstract). The cathode current collector has a plurality of surface voids (openings) which contain the cathode composition (active material). See col. 3, lines 44-50. The alkali metal anode layer may be a lithium coated foil such as copper foil. The copper foil

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(current collector) has a layer of lithium (active material) deposited on its surface. See col. 3, lines 64-66. The solid electrolyte layer includes an ionizable salt and a polymer, and is located between the anode and the cathode. The cathode collector may be made of aluminum. See col. 5, lines 5-62. See also claim 12.

Specifically, Fauteux teaches a solid state electrochemical cell having a porous cathode current collector. The cathode/current collector layer comprises a substrate which has a plurality of surface voids. As shown in Fig. 1, the substrate is in the form of a screen or grid. However, other physical forms such as foamed states, etched foils, electroplated films, woven or non-woven fabrics may be utilized as the substrate. A collector of expanded metal is disclosed in col. 2, lines 54-63. The cathode composition (active material) is coated onto at least one surface of the positive current collector. See col. 3, lines 44-53. The alkali metal anode layer may take the form of a lithium foil, a lithium coated foil such as nickel or copper foil having a layer of lithium deposited on its surface or a lithium alloy. See col. 3, lines 63-66. The electrolyte layer, which is ionically but not electrically conductive, takes the form of a solid material (separator) and is laminated to the alkali metal anode layer and the cathode/current collector layer. See col. 4, lines 3-6. Cathode compositions are disclosed at col. 5, lines 21-44. To produce the cathode/current collector material, the materials used to form the cathode composition are mixed together (slurry) and coated onto the surface of the current collector substrate (col. 5, lines 63-66).

Thus the claims are anticipated.

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The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. In re Fessman. Thus, whether the anode is formed of a lithium foil (no plasticizer needed), a lithium coated foil such as copper foil or a carbon containing slurry coated on a metal foil, a lithium polymer battery is the end result.

Allowable Subject Matter

Claims 23-29 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first and second paragraphs, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: the claims are directed toward a method of making a lithium polymer battery comprising preparing a positive active material slurry including a plasticizer to produce a first mixture, stirring the mixture, and then applying the first mixture to opposite sides of an aluminum foil with a plurality of through holes. The method further includes preparing a negative active material slurry including a plasticizer to produce a second mixture, stirring the mixture, and then applying the second mixture to opposite sides of a copper foil free of holes. The positive and negative electrodes are laminated on opposite sides of a separator and then the plasticizer from both electrodes is extracted.

Narang et al., US 6,168,885 teaches the fabrication of electrodes for a lithium polymer battery. Narang teaches a lithium secondary battery having an anode, a cathode and an electrolyte. The anode is formed by mixing an anode slurry including a material capable of

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intercalating metal ions, a binder, a solvent and optionally a monomer and a catalyst. The intercalation material may be a carbon material such as graphite, coke or mesocarbon microbeads. The binder is preferably polyvinylidene fluoride (PVDF). See col. 6, lines 37-53. The anode current collector may be a foil (without holes) or a grid (with holes). See col. 9, lines 43-50. The cathode is formed by a process similar to that for producing an anode (see col. 10, lines 54-col. 11, lines 3). Narang teaches that the disclosed method of forming electrodes obviates the need for the time consuming extraction process (plasticizer) and, therefore, the need to use porous current collectors (col. 4, lines 22-35). Thus, while Narang teaches and suggests a porous current collector is not needed, Narang does not teach the method of the instant claims because Narang eliminates the need for an extraction process (use of a plasticizer).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

March 21, 2003


Patrick Ryan
Supervisory Patent Examiner
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